Chapter 1. About this manual

This chapter provides an overview of the contents, purpose, compatibility, and the intended audience of this manual. This supplement manual intends to serve as a quick start guide for installing, commissioning and operating the AD30series inverter. This manual includes all the required parameter settings and program features.

READ AND FOLLOW ALL INSTRUCTIONS!
When installing and using this electrical equipment, basic safety precautions should always be followed, including the following:

WARNING – To reduce the risk of injury, do not permit children to use this product unless they are closely supervised at all times.

WARNING – To reduce the risk of electric shock, replace damaged cord immediately.

WARNING – It must be assured that all grounding connections are properly made and that the resistances do meet local codes or requirements

Safety and cautions
1.1 General Warnings
The manual contains basic instructions which must be observed during installation, operation and maintenance. The manual should be carefully read before installation and start-up by the person in charge of the installation. The manual should also be read by all other technical personnel/ operators and should be available at the installation site at all times.

Personnel Qualification and Training – All personnel for the operation, maintenance, inspection and installation must be fully qualified to perform that type of job. Responsibility, competence and the supervision of such personnel must be strictly regulated by the user.

Should the available personnel be lacking the necessary qualification, they must be trained and instructed accordingly. If necessary, the operator may require the manufacturer/supplier to provide such training.

Furthermore the operator/user must make sure that the personnel fully understand the contents of the manual.

Dangers of Ignoring the Safety Symbols – Ignoring the safety directions and symbols may pose a danger to humans as well as to the environment and the equipment itself. Non-observance may void any warranties.

Non-observance of safety directions and symbols may for example cause the following: Failure of important functions of the equipment/plant; failure of prescribed methods for maintenance and repair; endangerment of persons through electrical, mechanical and chemical effects; danger to the environment because of leakage of hazardous material; danger of damage to equipment and buildings.

Safety-oriented Operation – The safety directions contained in the manual, existing national regulations for the prevention of accidents as well as internal guidelines and safety-regulations for the operator and user must be observed at all times.

General Safety Directions for the Operator/User– If hot or cold equipment parts pose a danger then they must be protected by the operator/user against contact with people. Protective covers for moving parts (e.g. couplings) must not be removed when the equipment is running. Leaks (e.g. at the shaft seal) of hazardous pumping media (e.g. explosive, toxic, hot liquids) must be disposed of in such a way that any danger to personnel and the environment is removed. All government and local regulations must be observed at all times. Any danger to persons from electrical energy must be excluded by using good installation practices and working according to local regulations.

Safety Directions for Maintenance, Inspection and Assembly Work– It is the user's responsibility to make sure that all maintenance, inspection and assembly work is performed exclusively by authorized and qualified experts sufficiently informed through careful perusal of the Operating Instructions. The accident prevention regulations must be observed. All work on the equipment should be done when it is not operational and ideally electrically isolated. The sequence for shutting the equipment down is described in the manual and must be strictly observed. Pumps or pump units handling hazardous liquids must be decontaminated. Immediately upon completion of the work, all safety and protective equipment must be restored and activated. Before restarting the equipment, all points contained in chapter "Initial Start-up" must be observed.

Unauthorized Changes and Manufacturing of Spare Parts– Any conversion or changes of the equipment may only be undertaken after consulting the manufacturer. Original spare parts and accessories authorized by the manufacturer guarantee operational safety. Using non-authorized parts may void any liability on the part of the manufacturer.

Unauthorized Operation– The operational safety of the equipment delivered is only guaranteed if the equipment is used in accordance with the directions contained in this manual. Limits stated in the data sheets may not be exceeded under any circumstances.

Transportation and Intermediate Storage– Prolonged intermediate storage in an environment of high humidity and fluctuating temperatures must be avoided. Moisture and condensation may damage windings and metal parts. Non-compliance will avoid any warranty.

1.2 Purchase Inspection

⚠️CAUTION: Properly check the delivery before installation. Never install the drive when you find it damaged or lack a component. Incomplete or defective installation might cause accidents.

1.3 Installation

⚠️CAUTION: To ensure effective cooling, the drive must be installed vertically with at least 10 cm space above and below the casing.

⚠️CAUTION: When installed in an indoor location sufficient ventilation must be ensured by a vent or ventilator or similar device. Do not install in a place which is exposed to direct sunlight.

⚠️CAUTION: Do not let the drilling chips fall into the drive fin or fan during installation. This might affect the heat dissipation

1.4 Connection

WARNING: The connection of the drive must be carried out by qualified personnel only. Unqualified handling might lead to shock, burn, or death.

WARNING: Please double-check that input power has been disconnected before connecting the device, otherwise electrocution or fire can be caused.

WARNING: The earth terminal must be reliably grounded, otherwise touching the drive shell might lead to a shock.

WARNING: Selection of PV module type, motor load and drive must be adequate, or the equipment might get damaged.

WARNING: Grounding of this electrical equipment is mandatory. Never run the pump system when the ground wire is not connected to proper ground. Ignoring this instruction can lead to electrocution.

1.5 Operation

WARNING: The drive should only be connected to power after correct wiring, or the drive might get damaged.

WARNING: Do not modify the connection while the system is connected to power, or touching any part of it might cause electrocution

CAUTION: Adjust partial control parameters according to the steps indicated by the manual before the first operation. Do not change the control parameters of the drive by random, or it might damage the equipment.

CAUTION: The heat sink gets hot during operation. Do not touch it until it has cooled down again, or you might get burned.

CAUTION: At altitudes of more than 1,000 m above sea level, the drive should be derated for use. Output current should be derated by 10% for every 1,500 m increment of altitude

CAUTION: Never run the pump when it is not fully submerged in water. When the pump is installed the correct running direction can be determined by measuring the flow rates.

Chapter 2. Operation control panel description

2.1 Press function key description

Key symbol	Name	Function description
PRG	Menu key	Enter menu or exit
SET	Confirm key	Enter to menu step by step and confirm the setting value
∧	UP increase key	Data and function code increase
∨	DW reduce key	Data and function code reduce
◀◀	Shift	In the monitor status, press this key can select display monitoring parameter in circulation.
RUN	Running key	Use to start drive in keypad control mode
MF.K	Multiple function key	Programmed by F4-31 setting. Default is reverse running
STOP RESET	Stop and reset	In running status, this key can use to stop operation (F0-02). Reset malfunction in alarm mode.

2.2. Indicator description

Symbol	Indicator description
Hz	Unit of frequency（Hz）
A	Unit of current (Amp)
V	Unit of voltage（V）
FWD	Forward run indicator
REV	Reverse run indicator FWD，REV both flash in stand for DC braking
ALM	Fault indicator (alarm for over current, over voltage but that don't reach the level of fault limit)

2.3. Digital display area

5 digit LED display, it can use to display frequency reference, output frequency and kinds of monitoring data and fault alarm code.

2.4. Function code operation

There are 3 levels menu in respectively.

1. Function code parameters（First level menu）

2. Function code name（The second level menu）

3. Setting value of function code (the third level menu ）

Note: If in the third level menu, you can press PRG or SET key to return second menu. The difference is that press SET key will set parameter in controller board and then return to the second menu, press PRG key and return second menu directly without parameters storing.

2.5. Monitor parameters inquiry.

There two ways to inquiry monitoring parameters.

1. Press "◀◀"to inquiry 6 control common parameters (It is set by F4-26, F4-27,

F4-28)(Output frequency, output current, output voltage, and so on)

2. User also can go to d parameters to inquiry relative parameters.

Example: Inquiry d-02 (output current value of drive), see below fig.

2.6. Common parameters display

Press shift button of keypad can display output current, output frequency, output voltage, DC bus voltage, setting frequency and   IGBT temperature 6 parameters in circulation in monitor status.

2.7. Fault reset

Drive will display relative fault information if there are any alarm occurs.

User can reset it by "STOP/RESET" or external terminals (F5 group setting).   Once reset, drive place on standby status.

If drive place in fault status and without any reset, it is located in protection status and can't working.

The system of drive will initialize by itself when power on. The LED of keypad display -SGd- when DC bus of dive from low to high.

When DC bus reach start point, LED will display the frequency reference and flash all the time, means drive place on standby status.

Chapter 3. AD30series drive installation

3.1 About this chapter

This chapter includes the basic information about the mechanical and electrical installation of Drive and also provides steps to quickly operate the inverter.

For general instructions on installation and maintenance of AD30Drives, see *AD30User's manual.*

Safety instructions

WARNING! All electrical installation and maintenance work on the drive must be carried out by qualified electricians only. Follow the safety instructions listed below.

• Never work on the inverter, the braking chopper circuit, the motor cable or the motor when input power is applied to the inverter.

• After disconnecting the input power, always wait for 5 minutes to let the intermediate circuit capacitors discharge. Always ensure by measuring that no voltage is actually present.

• A rotating permanent magnet motor generates a dangerous voltage. Always ensure to lock the motor shaft mechanically before connecting a permanent magnet motor to the inverter, and before doing any work on a drive system connected to a permanent magnet motor.

3.2 Mechanical installation

In back mounting, fasten the drive to the wall with screws using four mounting holes.

Note: Installation Environment Requirements

1. Ambient temperature, the surrounding environment temperature take great effect for service life span of drive, don't allow surrounding temperature over than allowable temperature above (-10° C to +50° C)
2. Heat dissipation, install the drive on the surface of an incombustible object, and ensure that there is sufficient space around for heat dissipation. Install the drive vertically on the support using screws.
3. Vibration, it should be less than 0.6G, far away from the punching machine or the like.
4. Free from direct sunlight, high humidity and condensation
5. Free from corrosive, explosive and combustible gas
6. Free from oil dirt, dust and metal powder
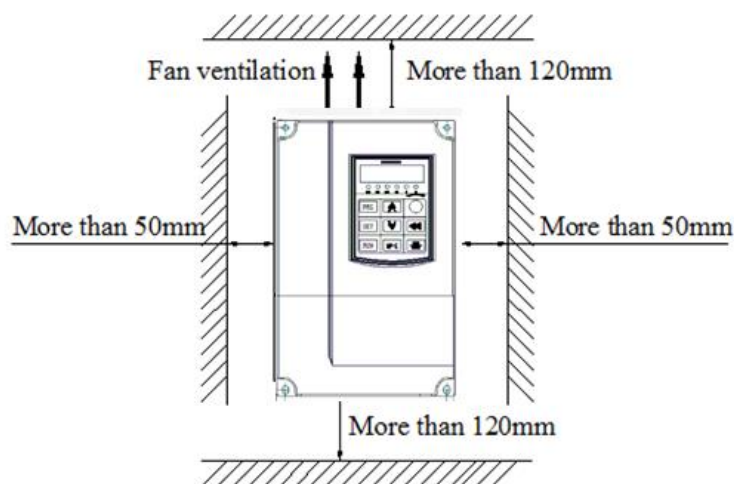
3.3. Installation and wiring

• Route the motor cable, input power cable and control cables separately.

• Make sure that the maximum cable lengths are not exceeded. For detailed information, see the user's manual.

• Make sure sufficient current capacity of the cable.

3.4 Main circuit terminals description

Terminals symbol	Function description
+ -	Positive and negative terminals of DC bus voltage
PB	P, PB connect braking resistor
R, S, T	AC input connecting
U, V, W	Connect to motor
E	Grounding terminals

3.5. Connection procedure

1. Strip the input power cable. Ground the bare shield of the cable (if any) 360 degrees under the grounding clamp. Fasten the grounding conductor (E) of the input power cable under the screw of the grounding clamp. Connect the grid to the U, V and W terminals.

2. Strip the motor cable. Ground the bare shield of the cable 360 degrees under the grounding clamp. Twist the shield to form as short a pigtail as possible and fasten it under the screw of the grounding clamp. Connect the phase conductors to the U, V and W terminals.

3.6 .Control circuit terminals
3.6.1 Control circuit terminals diagram
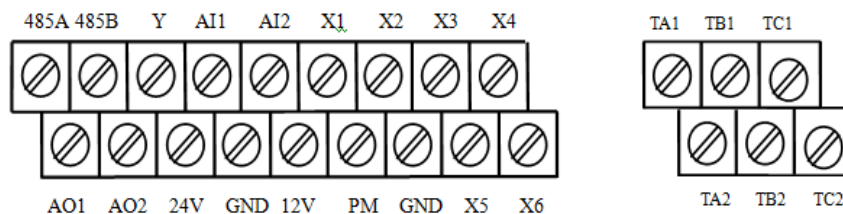
3.6.2. Control circuit terminals function description

Type	Terminals symbol	Terminals function	Remark
Power supply output	12V	12V/100mA power supply	
	GND	Frequency reference voltage signal common point (12, GND), analog current signal input negative point	
	24V	Output 24V/50mA power supply (24V, GND)	
Analog input	AI1	Analog voltage signal input terminals 1	0～10V
	AI2	Analog voltage signal input terminals 2	0～10V/0~20mA
Digital input terminals	PM	Terminal active level selection	If PM connect with power supply point, the multi-function terminals
	X1	Multi-function input terminals 1	
	X2	Multi-function input terminals 2	

	X3	Multi-function input terminals 3	and GND connecting is active. If PM connect with GND, the multi-function terminals and power supply points connecting is active. The function defined by parameter （F5-16～F5-21）
	X4	Multi-function input terminals 4	
	X5	Multi-function input terminals 5	
	X6	Multi-function input terminals 6, also can used for high speed pulse input terminals	
Analog output	AO1	Programmable voltage and current signal output terminal (Defined by F5-34 ~ F5-36 parameters)	Output voltage 0～10V
	AO2	Programmable frequency, voltage and current output (Defined by F5-39 ~ F5-43 parameters).	Maximum output high frequency is 50KHz, output voltage 0~10V, current 0~20mA
Programmable transistor Output	Y	Programmable open collector output, set by parameter F5-27	The maximum load current 50mA, maximum withstand voltage of 24V
Programmable relay output	TA-TB-TC1 TA-TB-TC2	Programmable relay output, set by parameter F5-28 F5-29	Contact capacity: AC250V 1A, Resistive load
RS485 communication	485A 485B	RS485 communication	

3.6.3. Jumper Description

SW1 Dial switch

Switch on the 0 ~ 10V, while setting [F5-39] = 0, AO2 output 0 ~ 10V.

Switch on the 4 ~ 20mA, while setting [F5-39] = 0, AO2 output 0 ~ 20mA.

Switch on the PWM, while setting [F5-39] = 1, AO2 output pulse signal.

SW2 Dial switch

Switch on the 0 ~ 10V, AI2 input 0 ~ 10V.

Switch on the 4 ~ 20mA, AI2 input 0 ~ 20mA.

Chapter 4. Simple parameter list

Table Symbol Description:

☆ - indicates that the parameter can be changed in the process of stopping and running.

✕ - indicates that the parameter can be changed in stop mode, can not be changed during running;

* - Indicates that the initial parameters related to the drives model

1.F0. parameters for basic running control

Code	Name	Description	Unit	Default setting	Property
F0-00	Model selection	0：General purpose 1：P type (variable torque load)	1	0	✕
F0-01	Control mode	0: VF control 1: Vectorized VF control 2：Open loop vector control 1 3: High performance open loop vector control 2	1	0	✕
F0-02	Running command channel selection	0: Operation panel (keypad) 1: External terminals 2: RS485terminals	1	1	☆
F0-03	Main frequency reference source A	0：Potentiometer of keypad 1: UP, DOWN of keypad. 2: AI1 (0-10V) 3: AI2 (0-10V/0-20mA) 5: PID close loop reference 6: Multi-segment speed control 7: Simple PLC 8: UP/DW of terminals 9: Communication 11: High speed pulse trains	1	0	☆
F0-04	Auxiliary frequency reference source B	0: Potentiometer of keypad 1：AI1 (0- 10V) 2：AI2（0-10V） 3：F0-07 4: High speed pulse trains reference 5: Multi-segment speed	1	1	☆
F0-05	The reference source selection of auxiliary frequency source B	0：Upper limit frequency 1：Main frequency source A	1	0	☆
F0-06	The operation of frequency source A and B combination setting	0: Main frequency source A 1: Auxiliary frequency source B 2：A+B 3：MAX（A，B） 4：MIN（A，B） 5：A-B	1	0	☆
F0-07	UP and Down key of keypad setting	0~Upper limit frequency	0.01	50.00	☆
F0-08	Upper limit frequency	5.00~650.00 Hz	0.01	50.00	✕

F0-09	Lower limit frequency	0.00Hz ~ F0-08	0.01	0.50	×
F0-10	Running mode under low limit frequency	0: Running with lower limit frequency 1: Stop 2: Sleep mode in stand by	1	0	×
F0-11	Wake up time in sleep mode	0.0~6000.0 S	0.1	0.0	×
F0-12	Acceleration mode 1	0.1~6000.0 s	0.1	*	☆
F0-13	Deceleration mode 1	0.1~6000.0s	0.1	*	☆
F0-14	Carrier frequency	1 ~ 10KHz	1	*	☆
F0-15	Ac drive running direction	0: Runs as forward direction 1: Runs as reverse direction 2: Reverse direction is forbidden	1	0	☆
F0-16	Parameters display in standby mode	0~39 （corresponding with d parameters）	1	3	☆
F0-17	Factory restore to factory setting	0: No operation 11: Parameters initialization 22: Clear fault record	1	0	×
F0-18	Parameters modify protection	0: No protection 1: Disable modify	1	0	×
F0-19	STOP operation range	0: Enable on keypad operation mode 1: Enable on all command mode	1	0	×

2. P1 parameters for start and stop parameters

Code	Name	Description	Unit	Default setting	Property
F1-00	Start up mode	0: Start up with starting frequency 1: Start up after DC braking 2: Start up with speed tracking	1	0	×
F1-01	Starting frequency	0.00~10.00Hz	0.01	0.50	×
F1-02	Starting frequency holding time	0.0~20.0s	0.1	0.0	×
F1-03	DC braking current when starting	0~150.0%	1	50.0	×
F1-04	DC braking time when starting	0.0~30.0s	0.1	0.0	×
F1-05	Stop mode	0: Deceleration to stop 1: Free stop	1	1	☆
F1-06	Dc braking start frequency when stop	0.00~50.00Hz	0.01	3.00	×
F1-07	Dc braking current when stop	0~150.0%	1	50.0	×
F1-08	DC braking holding time when stop	0.0~60.0s	0.1	0.0	×

F1-09	Speed tacking arithmetic Selection	0: Minimum current arithmetic 1: Voltage/frequency arithmetic.	1	0	✕
F1-10	Waiting time of speed tacking	0.0～10.0s	0.1	1.0	✕
F1-11	Speed tacking search time	3.0 ～ 100.0s	0.1	6.0	✕
F1-12	Current setting of speed tacking finished	1.00～50.00%	0.01	15.00	✕
F1-13	Starting voltage when braking	105.0~140.0%	0.1	123.0	☆
F1-14	Final voltage when braking	105.0~150.0%	0.1	128.0	☆
F1-15	Terminals running command detect when power on	0: Running command is disable when power on 1: Running command enable when power on	1	0	✕
F1-16	Stop speed	0.00~100.00%	0.01	1.00	☆
F1-17	Stop speed detect mode	0: Detect as speed reference 1: Detect as actual speed (for vector control)	1	1	☆

3. F2 motor parameters group

Code	Name	Description	Unit	Default setting	Property
F2-00	Motor type	0: Asynchronous motor 1: Permanent magnet synchronous motor	1	0	✕
F2-01	Motor rated voltage	1~700V	1	*	✕
F2-02	Motor rated frequency	5.00~600.00Hz	0.01	50.00	✕
F2-03	Motor rated current	0.1~3000.0A	0.1	*	✕
F2-04	Rated slip frequency	0.00~5.00Hz	0.01	*	✕
F2-05	Poles pair	1~50	1	2	✕
F2-06	No load current	10.0~ 80.0%	0.1	*	✕
F2-07	Stator resistor	0.00~50.00%	0.01	*	✕
F2-08	Rotor resistance	0.00~50.00%	0.01	*	✕
F2-09	Leakage inductance	0.00~50.00%	0.01	*	✕
F2-10	Motor parameter auto-tuning	0: No operation 1: static auto tuning 2: Completely auto tuning	1	0	✕
F2-11	Rated frequency of PMSM	5.00~600.00Hz	0.01	50.00	✕
F2-12	Rated voltage of PMSM	1~700V	1	*	✕
F2-13	Rated current of PMSM	0.1~3000.0A	0.1	*	✕
F2-14	Rated back EMF of PMSM	1~700V	1	*	✕
F2-15	Stator resistance of PMSM	0.00~50.00%	0.01	*	✕

F2-16	Active damping detection time	2~100	1	10	✕
F2-17	Active damping 1	0~1000	1	100	✕
F2-18	Active damping 2	0~1000	1	100	✕
F2-19	Active damping switching frequency	0.00~100.00Hz	0.01	100.00	✕
F2-20	Active damping limiter	0.00~3.00Hz	0.01	1.00	✕

PMSM stands for Permanent magnet synchronous motor

4.P3 group parameters for Vector control and V/f control

Code	Name	Description	Unit	Default setting	Property
F3-00	Low speed ASR proportional coefficient	0.01 ~ 30.00	0.01	0.60	☆
F3-01	Low speed ASR integral coefficient	0.01 ~ 10.00	0.01	1.00	☆
F3-02	ASR switching frequency 1	1.00~7.50Hz	0.01	5.00	☆
F3-03	High speed ASR proportional coefficient	0.01 ~ 30.00	0.01	0.60	☆
F3-04	High speed ASR integral coefficient	0.01 ~ 10.00	0.01	1.00	☆
F3-05	ASR switching frequency 2	8.00~50.00Hz	0.01	10.00	☆
F3-06	Current loop proportional coefficient	1~1000	1	20	✕
F3-07	Current loop integral coefficient	1~100	1	10	✕
F3-08	Slip compensation coefficient	50~200%	1	100	✕
F3-09	Speed feedback filter time constant	1~100 millisecond	1	6	✕
F3-10	Torque limit	0~200%	1	150	✕
F3-11	Cross compensation coefficient	0.00 ~ 0.50	0.01	0.20	✕
F3-12	Closed-loop voltage proportional coefficient	0~ 1.00	0.01	0.20	✕
F3-13	Voltage closed-loop integral coefficient	0~ 1.00	0.01	0.20	✕
F3-14	Magnetic field control proportional coefficient	10~1000	1	50	✕
F3-15	Magnetic field control integral coefficient	1~500	1	50	✕
F3-16	Current reference filter time constant	1~100millisecond	1	10	✕
F3-17	Whether torque control	0: Torque control disable 1: Torque control enable	1	0	☆
F3-18	Torque reference	0: Torque reference set by F3-19 1: AI1 2: AI2 3: Multi-segment speed 4：RS485 5：HDI	1	0	☆
F3-19	Torque reference by keypad setting	0.0～200.0%	0.1	50.0	☆
F3-20	Torque reference direction	0: Forward direction 1: Reverse direction	1	0	☆

F3-**21**	**Upper limit frequency reference source set selection**	**0: Upper limit frequency** **1: AI1** **2: AI2** **3: Multi-segment speed** **4: RS485** **5: HDI** **6: Potentiometer of keypad**	**1**	**0**	☆
F3-22	V/F curve selection	0: Standard V/F curve， V/F=constant 1: Square V/f curve 2: User defined V/f curve	1	0	✕
F3-23	Custom curve F1	0.0 ～100.0%	0.1	0.0	✕
F3-24	Custom curve V1	0.0 ～100.0%	0.1	0.0	✕
F3-25	Custom curve F2	0.0 ～100.0%	0.1	0.0	✕
F3-26	Custom curve V2	0.0 ～100.0%	0.1	0.0	✕
F3-27	Custom curve F3	0.0 ～100.0%	0.1	0.0	✕
F3-28	Custom curve V3	0.0 ～100.0%	0.1	0.0	✕
F3-**29**	**Torque boost**	**0.0~20.0%**	**0.1**	**2.0**	✕
F3-30	Low frequency oscillation suppression strength	0~1000	1	100	✕
F3-31	High frequency oscillation suppression strength	0~1000	1	0	✕
F3-32	High and low frequency turning point	5.00～50.00 Hz	0.01	20.00	✕
F3-33	V / F control slip compensation coefficient	0~200%	1	0	✕

5.P4 group parameters for auxiliary running control

Code	Name	Description	Unit	Default setting	Property
F4-00	Forward /reverse dead time	0.0~5.0s	0.1	0.1	☆
F4-01	Skip frequency 1	0.00 ~Upper limit frequency	0.01	0.00	☆
F4-02	Skip frequency 1 range	0.00 ~5.00Hz	0.01	0.00	☆
F4-03	Skip frequency 2	0.00 ~ Upper limit frequency	0.01	0.00	☆
F4-04	Skip frequency 2 range	0.00 ~5.00Hz	0.01	0.00	☆
F4-05	Skip frequency 3	0.00 ~ Upper limit frequency	0.01	0.00	☆
F4-06	Skip frequency 3 range	0.00 ~5.00Hz	0.01	0.00	☆
F4-07	Jog frequency	0.00~ Upper limit frequency	0.01	5.00	☆
F4-08	Jog acceleration time	0.1~6000.0s	0.1	10.0	☆
F4-09	Jog deceleration time	0.1~6000.0s	0.1	10.0	☆
F4-10	Acceleration time 2	0.1~ 6000.0S	0.1	*	☆
F4-11	Deceleration time 2	0.1~ 6000.0S	0.1	*	☆
F4-12	Acceleration time 3	0.1~ 6000.0S	0.1	*	☆
F4-13	Deceleration time 3	0.1~ 6000.0S	0.1	*	☆
F4-14	Acceleration time 4	0.1~ 6000.0S	0.1	*	☆
F4-15	Deceleration time 4	0.1~ 6000.0S	0.1	*	☆
F4-16	Acceleration /deceleration mode	0: Linear, 1: S curve	1	0	✕
F4-17	Terminal UP/DW rate	0.01~100.00Hz/s	0.01	1.00	☆

F4-18	FDT 1（frequency detect level ）setting	0.00~upper limit frequency	0.01	50.00	☆
F4-19	FDT 1 lag detection value	0.0~100.0%	0.1	5.0	☆
F4-20	FDT 2（frequency detect level ）setting	0.00~upper limit frequency	0.01	50.00	☆
F4-21	FDT 2 lag detection value	0.0~100.0%	0.1	5.0	☆
F4-22	Frequency arrival detection range	0 0.00~20.00Hz	0.01	1.00	☆
F4-23	PWM modulation	Unit 's digit: if over modulation 0: Not modulation 1: Modulation Ten's digit: Modulation mode 0: Three phase modulation at low speed, two phase modulation at high speed 1: Allways three phase modulation Hundred's digit: Low speed deal with 0: When the low speed carrier frequency large than 3Khz, runs with within 3Khz. 1: Carrier frequency runs with previous setting	1	0	✕
F4-24	**AVR (auto voltage regulation)**	**0: no operation** **1: Enable** **2: Disable in deceleration**	**1**	**0**	✕
F4-25	Drop control	0.0~10.00Hz	0.01	0.0	✕
F4-26	**Operation monitoring items selection**	**0～3939: Low two bit and high two bit, each stands for one d parameters. 3 parameters can determine 6 monitor parameters, press Shift key to circulation display in running.**	**1**	**0100**	☆
F4-27	**Operation monitoring items selection 2**		**1**	**0502**	☆
F4-28	**Operation monitoring items selection 3**		**1**	**3226**	☆
F4-29	Speed display coefficient	0.1~999.9%	0.1	100.0	☆
F4-301	Linear speed display coefficient	0.01~99.99	0.01	1.00	☆
F4-31	Multifunction key MF.K set	0: REV 1: Jog forward 2: Jog　Reverse 3: Running command switchover	1	0	✕

6.F5 group parameters for external terminals input and output

Code	Name	Description	Unit	Default setting	Property
F5-00	AI1minimum input	0.00~10.00V	0.01	0.00	☆
F5-01	AI1 minimum input	-100.00~100.0%	0.1	0.0	☆

	corresponding value				
F5-02	AI1 maximum input	0.00~10.00V	0.01	10.00	☆
F5-03	AI1 maximum input corresponding value	-100.00~100.0%	0.1	100.0	☆
F5-04	AI1filter time constant value	0.01~50.00s	0.01	0.10	☆
F5-05	AI2 minimum input	0.00~10.00V	0.01	0.00	☆
F5-06	AI2　minimum input corresponding value	-100.00~100.0%	0.1	0.0	☆
F5-07	AI2 maximum input	0.00~10.00V	0.01	10.00	☆
F5-08	AI2 maximum input corresponding value	-100.00~100.0%	0.1	100.0	☆
F5-09	AI2 filter time constant value	0.01~50.00s	0.01	0.10	☆
F5-10	PLUSE minimum input	0.00~50.00KHz	0.01	0.10	☆
F5-11	PLUSE minimum input corresponding value	-100.00~100.0%	0.1	0.0	☆
F5-12	PLUSE maximum value	0.00~50.00KHz	0.01	50.00	☆
F5-13	PLUSE Maximum value corresponding value	-100.00~100.0%	0.1	100.0	☆
F5-14	PULSE filter time constant value	0.01~50.00s	0.01	0.10	☆
F5-15	**External terminal command control mode**	**0: Two lines control mode 1** **1: Two lines control mode 2** **2: Three lines control mode 1** **3: Threes lines control mode 2**	**1**	**1**	✕
F5-16	**X1terminals function selection（0~40）**	0: No function **1: FWD Forward command**		1	✕
F5-17	X2 terminals function selection（0~40）	2: REV Reverse command 3: External fault input (normally open)		2	✕
F5-18	X3 terminals function selection（0~40）	4: DC braking		7	✕
F5-19	X4 terminals function selection（0~40）	**5: Emergency stop input** 6: Fault reset input		8	✕
F5-20	**X5 terminals function selection（0~40）**	7: Multi-speed input 1 8: Multi-speed input 2		1	✕
F5-21	X6　terminals function selection（0~50）	9: multispeed input 3 10: Multi-speed input 4 11: three-line control 12: Terminal UP 13: Terminal DOWN 14: Terminal reset 15: Acceleration and deceleration selection terminal 1 16: Acceleration and deceleration selection terminal 2 17: PLC Pause running 18: PLC state reset (modes 1, 2) 19: Forward jog 20: reverse jog 21: Traverse suspend operation		10	✕

		22: Traverse reset			
		23: PID suspend operation			
		24: Interior timer enable			
		25: The internal timer is cleared			
		26: Counter trigger input			
		27: Counter Reset (reset to 0)			
		28: Frequency reference given A and B switchover			
		29: Frequency reference given A and A + B switchover			
		30: Frequency reference given B and A + B switchover			
		31: deceleration to stop			
		32: Torque control prohibition			
		33: Length counter input			
		34: The length of the counter is cleared			
		35: Command given source is forcibly set by keypad			
		36: Command given source is forcibly set by terminal			
		37: Command given source is forcibly set by the communication.			
		38: PID parameters			
		39: External fault normally closed input			
		40: Pulse input (only valid for X6)			
F5-27	Y transistor output selection	0: No function	1	1	☆
F5-28	Relay 1 output selection	1: Run state	1	1	☆
F5-29	Relay 2 output selection	2: Fault output 3: Frequency arrival 4: detection frequency FDT1 arrival 5: detection frequency FDT2 arrival 6: Zero speed running 7: Lower limit frequency arrival 8: Upper limit frequency arrival 9: Counter reaches the specified value (greater than the specified value, output ON) 10: Counter reach final value (equal to the final value, output a ON clock cycle counter signal) 11: Internal timer reaches (Output a ON timer unit signal) 12: Running time is reached (greater than the set time Output	1	1	☆

Code	Name	Description	Unit	Default	Property
		ON) 13: PLC a segment operation is completed (Output a 0.5s ON signal) 14: PLC run cycle is complete (Output a 0.5s ON signal) 15: Over-torque warning 16: Drive standby 17: Length arrive 18: Place in sleep mode 19: AI1 input over limit 20: Module temperature reaches			
F5-34	AO1 output selection	0: Frequency reference 1: Run Frequency 2: Output current 3: DC bus voltage 4: Output voltage 5: output power (100% corresponds to 200% of rated power) 6: Torque current 7: AI1 8: AI2 9: Reserved 10: High-speed pulse input 11: RS485 set 12: Length 13: count value 14 to 20 Reserved	1	0	☆
F5-35	AO1 analog output corresponding to 0%	0.0~100.0%, output 0~10V, 100.00% corresponding to 10V, output 0~20mA, 100.00% corresponding to 20mA.	0.1	0.0	☆
F5-36	AO1 analog output corresponding to 100.00%	0.0~100.0%	0.1	100.0	☆
F5-39	AO2 output type selection	0: Analog 1：HDO pulse trains output	1	0	☆
F5-40	HDO pulse train upper limit	0.10~50.00KHz	0.01	50.00	☆
F5-41	AO2 output selection	As same as AO1 selection	1	1	☆
F5-42	AO2 analog output corresponding to 0%	0.0~100.0%，when output 0~10V，100.0% corresponding to 10V；when output is high speed pulse train ， 100.0% correspond to 50.00KHz	0.1	0.0	☆
F5-43	AO2 analog output corresponding to 100.00%	0.0~100.0%	0.1	100.0	☆

7.F6 group parameters for PID control

Code	Name	Description	Unit	Default	Property

				setting	
F6-00	Select PID reference command source	0: Potentiometer of keypad 1：PB.0 reference 2：F6.01 reference 3：AI1 4：AI2 5：RS485 6：PLUSE trains 7：multi-speed	1	0	☆
F6-01	PID reference	0~100.0%	0.1	50.0	☆
F6-02	PID feedback channel selection	0：AI1　　　1：AI2 2：HDI　　　3：RS485	1	0	☆
F6-03	Regulation characteristics	0: Positive　　1: Negative	1	0	☆
F6-04	Proportional gain	0.0~50.0	0.1	5.0	☆
F6-05	Integration time constant	0.1~100.0s	0.1	10.0	☆
F6-06	Differential Gain	0.0~5.0	0.1	0.0	☆
F6-08	Preset frequency	0.0～100.0% upper limit frequency	0.1	50.0	☆
F6-09	Preset frequency holding time	0.0 ~ 3000.0S	0.1	0.0	☆
F6-10	Feedback disconnection detection threshold	0.0～100.0%	0.1	5.0	☆
F6-11	Feedback disconnection judgment time	0.0~3000.0s，0.0　means not perform disconnect judge.	0.1	0.0	☆
F6-12	PID limited negative output	0~100.0%	0.1	0.0	☆
F6-13	Twice the maximum output deviation	0.00~100.00%	0.01	1.00	☆

8.F7 group parameters for multi-speed and simple PLC control

Code	Name	Description	Unit	Default setting	Property
F7-00	Programmable multi segment speed running setting	Unit' digit： 0: Single segment running finished stop 1: Single segment running finished and keep the finial setting 2: cycle running continue Ten's digit 0: Running time unit is second 1: Running time unit is minute Hundred's digit: Reserve Thousand's digit: restart selection 0: Every restart from 0 segment point 1: Every restart from break off point frequency.	1	2	×

F7-01	Multi-speed frequency 0	0.0 ~ 100.0%	0.1	10.0	☆
F7-02	Multi-speed frequency 1	0.0 ~ 100.0%	0.1	20.0	☆
F7-03	Multi-speed frequency 2	0.0 ~ 100.0%	0.1	30.0	☆
F7-04	Multi-speed frequency 3	0.0 ~ 100.0%	0.1	40.0	☆
F7-05	Multi-speed frequency 4	0.0 ~ 100.0%	0.1	50.0	☆
F7-06	Multi-speed frequency 5	0.0 ~ 100.0%	0.1	70.0	☆
F7-07	Multi-speed frequency 6	0.0 ~ 100.0%	0.1	80.0	☆
F7-08	Multi-speed frequency 7	0.0 ~ 100.0%	0.1	100.0	☆
F7-09	Multi-speed frequency 8	0.0 ~ 100.0%	0.1	10.0	☆
F7-10	Multi-speed frequency 9	0.0 ~ 100.0%	0.1	20.0	☆
F7-11	Multi-speed frequency 10	0.0 ~ 100.0%	0.1	30.0	☆
F7-12	Multi-speed frequency 11	0.0 ~ 100.0%	0.1	40.0	☆
F7-13	Multi-speed frequency 12	0.0 ~ 100.0%	0.1	50.0	☆
F7-14	Multi-speed frequency 13	0.0 ~ 100.0%	0.1	70.0	☆
F7-15	Multi-speed frequency 14	0.0 ~ 100.0%	0.1	80.0	☆
F7-16	Multi-speed frequency 15	0.0 ~ 100.0%	0.1	100.0	☆
F7-17	Speed 0 running time	0.0~3000.0	0.1	10.0	☆
F7-18	Speed 0 running direction and acceleration/deceleration	Unit's digit：0：Forward 1: Reverse Ten's digit： 0: Acceleration/deceleration 1 1: Acceleration/deceleration 2 2: Acceleration/deceleration 3 3: Acceleration/deceleration 4	1	0	☆
F7-19	Speed 1 running time	0.0~3000.0	0.1	10.0	☆
F7-20	Speed 1 running direction and acceleration/deceleration	As same as speed 1 description	1	0	☆
F7-21	Speed 2 running time	0.0~3000.0	0.1	10.0	☆
F7-22	Speed 2 running direction and acceleration/deceleration	As same as speed 1 description	1	0	☆
F7-23	Speed 3 running time	0.0~3000.0	0.1	10.0	☆
F7-24	Speed 3 running direction and acceleration/deceleration	As same as speed 1 description	1	0	☆
F7-25	Speed 4 running time	0.0~3000.0	0.1	10.0	☆
F7-26	Speed 4 running direction and acceleration/deceleration	As same as speed 1 description	1	0	☆
F7-27	Speed 5 running time	0.0~3000.0	0.1	10.0	☆
F7-28	Speed 5 running direction and acceleration/deceleration	As same as speed 1 description	1	0	☆
F7-29	Speed 6 running time	0.0~3000.0	0.1	10.0	☆
F7-30	Speed 6 running direction and acceleration/deceleration	As same as speed 1 description	1	0	☆
F7-31	Speed 7 running time	0.0~3000.0	0.1	10.0	☆
F7-32	Speed 7 running direction and acceleration/deceleration	As same as speed 1 description	1	0	☆
F7-33	Speed 8 running time	0.0~3000.0	0.1	10.0	☆
F7-34	Speed 8 running direction and	As same as speed 1 description	1	0	☆

	acceleration/deceleration				
F7-35	Speed 9 running time	0.0~3000.0	0.1	10.0	☆
F7-36	Speed 9 running direction and acceleration/deceleration	As same as speed 1 description	1	0	☆
F7-37	Speed 10 running time	0.0~3000.0	0.1	10.0	☆
F7-38	Speed 10 running direction and acceleration/deceleration	As same as speed 1 description	1	0	☆
F7-39	Speed 11 running time	0.0~3000.0	0.1	10.0	☆
F7-40	Speed 11 running direction and acceleration/deceleration	As same as speed 1 description	1	0	☆
F7-41	Speed 12 running time	0.0~3000.0	0.1	10.0	☆
F7-42	Speed 12　running direction and acceleration/deceleration	As same as speed 1 description	1	0	☆
F7-43	Speed 13 running time	0.0~3000.0	0.1	10.0	☆
F7-44	Speed 13 running direction and acceleration/deceleration	As same as speed 1 description	1	0	☆
F7-45、	Speed 14 running time	0.0~3000.0	0.1	10.0	☆
F7-46	Speed 14 running direction and acceleration/deceleration	As same as speed 1 description	1	0	☆
F7-47	Speed 15 running time	0.0~3000.0	0.1	10.0	☆
F7-48	Speed 15 running direction and acceleration/deceleration	As same as speed 1 description	1	0	☆

9.F8 group parameters for communication

Code	Name	Description	Unit	Default setting	Property
F8-00	Baud selection	0：300bps　　1：600bps 2：1200bps　　3：2400bps 4：4800bps　　5：9600bps 6：19200bps　7：38400bps	1	5	☆
F8-01	Data format	0: No parity 1: Odd 2: Even parity	1	0	☆
F8-02	Address	0~247　0: Broadcast address does not return data	1	1	☆
F8-03	The machine response delay	0~100ms	1	5	☆
F8-04	Timeout judgment time	0.0~100.0s；0.0 means time out	0.1	0.0	☆
F8-05	Master-Slave Select	0: Slave port　1: Master port	1	0	☆
F8-06	RS485 frequency reference scale factor	0~999.9%	0.1	100.0	☆
F8-07	Writing operation if return data	0: Return　　1: No return	1	0	☆

10. Advanced F9 group parameters

Code	Name	Description	Unit	Default setting	Property
F9-00	Swing frequency amplitude	0.0~100.0%	0.1	0.0	☆
F9-01	Kick frequency amplitude	0.0~50.0%	0.1	0.0	☆

F9-02	Triangular wave rise time	0.1~3600.0s	0.1	5.0	☆
F9-03	Triangular wave fall time	0.1~3600.0s	0.1	5.0	☆
F9-04	Specify the value of the counter	0~65535	1	1000	☆
F9-05	Counter final value	0~65535	1	2000	☆
F9-06	Setting length	0~65535meter	1	1000	☆
F9-07	The number of pulses per meter	0.1~6553.5	0.1	100.0	☆
F9-08	Internal timer timer unit	0.01~99.99s	0.01	1.00	☆
F9-09	internal timer cycle period	1~65535	1	10	☆
F9-10	Setting the running time	0~65535hour	1	65535	☆
F9-11	**X1 switch-on delay time**	**0.0~3600.0S**	**0.1**	**0.0**	☆
F9-12	**X1 off delay time**	**0.0~3600.0S**	**0.1**	**0.0**	☆
F9-13	X2 switch-on delay time	0.0~3600.0S	0.1	0.0	☆
F9-14	X2 off delay time	0.0~3600.0S	0.1	0.0	☆
F9-15	**X3 switch-on delay time**	**0.0~3600.0S**	**0.1**	**0.0**	☆
F9-16	**X3 off delay time**	**0.0~3600.0S**	**0.1**	**0.0**	☆
F9-17	Y1 output delay time	0.0~3600.0S	0.1	0.0	☆
F9-18	Relay 1 output delay time	0.0~3600.0S	0.1	0.0	☆
F9-19	Relay 2 output delay time	0.0~3600.0S	0.1	0.0	☆

11. FA Enhanced parameter group

Code	Name	Description	Unit	Default setting	Property
FA-00	VF separation mode	0:no separation 1:half separation 2:full separation	1	1	×
FA-01	Voltage source select	0:FA-02 1：AI1 2：AI2 3：Keyboard potentiometer 4: PID 5 AI1+PID	1	0	×
FA-02	Voltage setting	0~100.0%rated voltage	0.1	0.0	×
FA-03	Voltage up-down time	0.1~3600.0S	0.1	0.1	×
FA-05	Vector control2 flux setting	80.00~100.00%	0.01	90.00	×
FA-06	UP/DW setting value Stop reset	0: no stop reset 1:stop reset	0	0	×
FA-07	Frequency accuracy	0: 0.01Hz 1:0.1Hz	1	0	×
FA-08	Vector control ASR type	0: Integral separation 1:standard	1	1	×
FA-09	Braking action	0: no action 1:action	1	0	×

12. FB Enhanced PID parameter group

Code	Name	Description	Unit	Default setting	Property
Fb-00	Distance pressure gauges range	0.001~60.000MPa	0.001	1.600	☆
Fb-01	Pressure setting	0.001~20.000MPa	0.001	0.500	☆
Fb-02	UP/DW setting value automatic storage	0:no storage 1:storage	1	0	☆
Fb-03	Sleeping frequency	0.00~600.00Hz	0.01	0.00	☆
Fb-04	Sleeping delay time	0.0~3000.0S	0.1	60.0	☆
Fb-05	Wake up the pressure	00.0~100.0%	0.1	0.0	☆
Fb-06	Waking up delay time	0.0~3000.0S	0.1	0.5	☆

Fb-07	Under load protect value	0.0~100.0%　0.0：no protect	0.1	0.0	☆
Fb-08	Under load protect delay time	0.0~600.0S	0.1	20.0	☆
Fb-09	PID parameter select	0: the first group parameter 1:determined by X terminal 2:determined by PID error 3: determined by frequency	1	0	☆
Fb-10	The 2nd proportional gain	0.0~50.0	0.1	5.0	☆
Fb-11	The 2nd integration time	0.1~100.0S	0.1	10.0	☆
Fb-12	The 2nd differential gain	0.0~5.0	0.0	0.0	☆
Fb-13	PID parameter switching deviation1	0.0~100.0%	0.1	20.0	☆
Fb-14	PID parameter switching deviation2	0.0~100.0%	0.1	80.0	☆
Fb-15	PID parameter switching frequency1	0.0~100.0%F0-08	0.1	20.0	☆
Fb-16	PID parameter switching frequency 2	0.0~100.0% F0-08	0.1	80.0	☆

13. Fd group parameters for protection

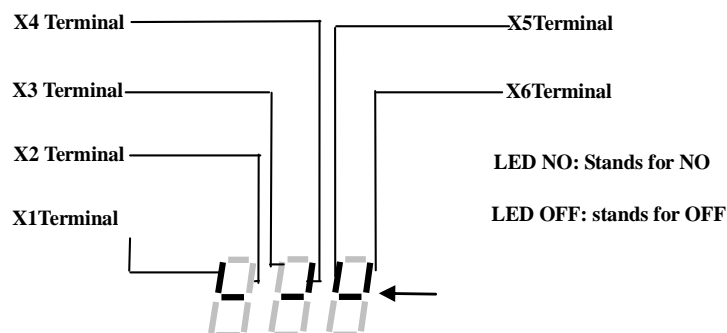| Code	Name	Description	Unit	Default setting	Property
Fd-00	Current limit value	100.0~200.0%	0.1	*	☆
Fd-01	Frequency drop time when over current	1.0~200.0s	0.1	5.0	☆
Fd-02	Over voltage limit	110.0~145.0%	1	130.0	☆
Fd-03	Overvoltage suppression gain	0~10	1	2	☆
Fd-04	Phase loss protection	Unit's digit: Input phase limit 0: No protection 1: Protection Ten's digit: Output phase limit 0: No protection 1: Protection	1	11	☆
Fd-05	Motor overload protection	20.0~100.0%	0.1	100.0%	☆
Fd-06	Pre-alarm value of over torque	20.0~200.0%	0.1	*	☆
Fd-07	Over torque detect delay time	0.0~60.0s	0.1	0.1	☆
Fd-08	Fault auto reset times	0~5	1	0	☆
Fd-09	Failure self-reset interval time	0.1~600.0s	0.1	1.0	☆
Fd-10	Fault relay output during reset	0: No output 1: Output	1	0	☆
Fd-11	AI1 input voltage low limit	0.00~10.00V	0.01	2.00	☆
Fd-12	AI1input voltage upper limit	0.00~11.00V	0.01	8.00	☆
Fd-13	Module temperature reaches	25.0~90.0℃	0.1	70.0	☆
Fd-14	Previous two faults	0~30	1	0	×
Fd-15	Previous faults	0~30	1	0	×
Fd-16	Current fault	0~30	1	0	×
Fd-17	Output frequency at current fault	0 ~Upper limit frequency	0.01	0.00	×
Fd-18	Output current at current fault	0 ~ 3000.0A	0.1	0.0	×

Fd-19	DC bus voltage at current fault	0～800V		1	0	×

D Group parameters for working status monitor

Note：Press shift button of keypad can display output current, output frequency, output voltage, DC bus voltage, DC bus current and input power 6 parameters in circulation in monitor status.

Monitor code	Contents	Mini. Unit
d-00	Current output frequency	0.01Hz
d-01	Current output voltage	1V
d-02	Current output current	0.1A
d-03	Current frequency reference	0.01Hz
d-04	Current output frequency 2	0.01Hz
d-05	DC bus voltage value	1V
d-06	Module temperature	0.1℃
d-07	PID reference value	0.1%
d-08	PID feedback	0.1%
d-09	Speed	rmp
d-10	Running liner frequency	0.01*
d-11	External pulse train input	0.01KHz
d-12	RS485 reference	
d-13	Reserve	
d-14	AI1	0.1V
d-15	AI2	0.1V
d-16	DI terminals status	
d-17	DO terminals status	
d-18	Single continuous run time	1H
d-19	Total running time	1H
d-20	External pulse count value	
d-21	Internal timer count	
d-22	Actual length	m
d-23	Pressure reference	MPa
d-24	Actual pressure	MPa
d-37	Rated voltage of Drive	1V
d-38	Rated current of Drive	0.1A
d-39	Software version	

XI input terminals status description: The last three to five digital display digital input status

X4 Terminal   X5Terminal

X3 Terminal   X6Terminal

X2 Terminal

X1Terminal

LED NO: Stands for NO

LED OFF: stands for OFF

Chapter 5. Parameters description in detail

F0-00	Model selection	0： General purpose	1	0	×
		1： P type (variable torque load)			

0: Suitable for driving general purpose constant torque heavy load

  For heavy load we need select G type models.

1: Suitable for driving fans pumps, etc variable torque light load

The power of P type mode for fans, pumps light load lower than G constant torque model one range.

Note: This value can't change after factory leaving.

For some fans pumps application, such as boost fans, deep well pump, which load is heavy. Select the AC Drive should according to the actual current.

The tolerance capacitors of G type: 150% rated current for 1 minute, 180% rated current for 2 seconds.

The tolerance capacitors of P type: 120% rated current for 1 minute, 150% rated current for 2 seconds.

F0-01	Control mode	0: VF control	1	0	×
		1: Vectorized VF control			
		2：Open loop vector control 1			
		3: High performance open loop vector control 2			

0: V/F control

No need install encoder, good compatibility and stable running. Suits for the applications, which no high request for loads, and one drive for more than one motors, and motor auto-tuning cannot be performed or the motor's parameters can be acquired through other methods, such as fans, pumps load.

1: Vectorized VF control,

Do vectorized for V/F control to enhanced control accuracy, stability of control and improved the torque output at low speed. Not sensitive to motor parameters.

2: Open loop sensorless vector control 1:

Unique method vector control, vector control versatility relatively strong, has steady performance, but the dynamic indicators worse than the high performance open loop vector control 2, insensitive to motor parameters.

3: High performance sensorless vector control 2

It uses a rotor field oriented vector control, with high static and dynamic performance control, sensitive to motor parameters. This control mode suits for high performance general purpose application without encoder, such as machine, centrifugal machine, drawbench, injection mold machine, etc. one drive only allow to control one motor.

Please configure motor group parameters carefully, and performance ID auto tuning when apply this control mode.

F0-02	Running command channel selection	0: Operation panel (keypad)	1	1	☆
		1: External terminals			
		2: RS485terminals			

Selects AC Drive running command input channel,

The AC Drive control command includes starting, stop, forward, reverse, jog function.

0: Keypad (operation panel); The running command is controlled by RUN, STOP, MF.K (through F4-31) by keypad.

1: External terminals The running command controlled by multiple function terminals. It can achieved to forward, reverse, Jog, reverse running with two lines or three lines control, see F0-15, F5-15～F5-21 function code in detail.

2: communication command

The running command is given by communication, see the communication protocol F8 group description.

F0-03	Main frequency reference source A	0：Potentiometer of keypad 1: UP, DOWN of keypad. 2: AI1 (0-10V) 3: AI2 (0-10V/0-20mA) 5: PID close loop reference 6: Multi-speed control 7: Simple PLC 8: UP/DW of terminals 9: Communication 11: High speed pulse trains	1	0	☆
F0-04	Auxiliary frequency reference source B	0: Potentiometer of keypad 1: AI1 (0- 10V) 2: AI2（0-10V） 3: F0-07 (UP and Down of keypad reference setting) 4: High speed pulse trains reference 5: Multi-segment speed	1	1	☆
F0-05	The reference source selection of auxiliary frequency source B	0：Upper limit frequency 1：Main frequency source A	1	0	☆
F0-06	The operation of frequency source A and B combination setting	0: Main frequency source A 1: Auxiliary frequency source B 2: A+B 3: MAX（A，B） 4: MIN（A，B） 5: A-B	1	0	☆

There are two frequency reference source of main and auxiliary reference (A and B). The user can select frequency reference according actual application request.

F0-08	Upper limit frequency	5.00~650.00 Hz	0.01	50.00	×
F0-09	Lower limit frequency	0.00Hz ~ F0-08	0.01	0.50	×
F0-10	Running mode under low limit frequency	0: Running with lower limit frequency 1: Stop 2: Sleep mode in stand by	1	0	×
F3-21	Upper limit frequency reference source set selection	0: Upper limit frequency 1: AI1 2: AI2 3: Multi-segment speed 4: RS485 5: HDI 6: Potentiometer of keypad	1	0	☆

The upper limit frequency is upper limit value of output frequency of AC Drive.
When frequency reference is set by the external analog reference, multiple speed and simple PLC, the given value is percent %, their reference value is upper limit frequency.

Use F3-21 to set the value of upper limit frequency source.

F0-09, lower limit frequency used to defined lower limit output frequency of AC drive.

F0-10 running mode selection used to select stop, running and go to sleep mode when output frequency is lower than F0-09.

Note: If F0-10 set for 1, Ac drive stop when output frequency lower than F0-09. It request confirm STOP command again to start Ac drive when control by terminals or RS485 mode, when starting command is open.

If controlled by keypad or pulse terminals, it need trigger starting signal again to start AC drive. In terminals control mode, only terminals signal is disable, and enable again to make AC drive start again.

F0-12	Acceleration time1	0.1~6000.0 s	0.1	*	☆
F0-13	Deceleration time1	0.1~6000.0s	0.1	*	☆

Acceleration time is the output frequency from 0Hz to motor rated frequency ramp up time.

Deceleration time is the output frequency from motor rated frequency to 0Hz ramp down time.

F0-14	Carrier frequency	1 ~ 10KHz	1	*	☆

Carrier frequency mainly affects the operation of the audio noise and thermal effects.

When the ambient temperature is high, the motor load is heavy, it should be appropriate to reduce the carrier frequency in order to improve the thermal characteristics of the Ac drive.

F0-15	Ac drive running direction	0: Runs as forward direction 1: Runs as reverse direction 2: Reverse direction is forbidden	1	0	☆

This parameter is used to change the AC drive output direction, thereby to check the motor running direction as well.

0: Running direction as same as setting

1: Running direction is reverse as setting.

2: Reverse running direction is forbidden.

If the output frequency is big, but output water yield is low in good sunlight condition, please used this parameters to change pump running direction or change motor wiring phase.

F0-17	Factory restore to factory setting	0: No operation 11: Parameters initialization 22: Clear fault record	1	0	×

To modify the parameters of the AC drive to factory default.

0: No operation

11: Parameters initialization, restore all parameters setting back to default setting.

22: Clear fault records

Note: Set F0-00 (AC drive modes G/P type selection properly) according to the actual situation before initialization. This parameter can't be restore.

F0-18	Parameters modify protection	0: No protection 1: Disable modify	1	0	×

0: No protection

1: All parameters under protection, can't modify. But F0-07 in monitor status can changed by UP and DOWN button of keypad.

F1-00	Start up mode	0: Start up with starting frequency 1: Start up after DC braking 2: Start up with speed tracking	1	0	×

0: Start up with starting frequency F1-01 setting.
1: Performance DC braking first, and then start from still for application which need starting from still.
2: Start up with speed tracking for fans application.

F1-15	Terminals running command detect when power on	0: Running command is disable when power on 1: Running command enable when power on	1	1	×

0: Start running command is invalid when power on.
If the running command selection source is terminal control when AC drive power on. Even if terminals command is enable, the AC drive will not response to start, to avoid bring damaged when AC drive staring suddenly. If need start system, user have to disable terminals first and then start it.
1: Starting running command is enable.
Ac drive starts immediately when power on if terminals command is enable.

F2-00	Motor type	0: Asynchronous motor 1: Permanent magnet synchronous motor	1	0	×
F2-01	Motor rated voltage	1~700V	1	*	×
F2-02	Motor rated frequency	5.00~600.00Hz	0.01	50.00	×
F2-03	Motor rated current	0.1~3000.0A	0.1	*	×
F2-04	Rated slip frequency	0.00~5.00Hz	0.01	*	×
F2-05	Poles pair	1~50	1	2	×
F2-06	No load current	10.0~ 80.0%	0.1	*	×

When the asynchronous motor is first time using, the user need to configuration these motor parameters according to nameplate of motor.
Performance sensorless vector control (F0-01 for 2 or3), it must performance motor auto tuning first.

F2-10	Motor parameter auto-tuning	0: No operation 1: Static auto tuning 2: Completely auto tuning	1	0	×
F2-11	Rated frequency of PMSM	5.00~600.00Hz	0.01	50.00	×
F2-12	Rated voltage of PMSM	1~700V	1	*	×
F2-13	Rated current of PMSM	0.1~3000.0A	0.1	*	×
F2-14	Rated back EMF of PMSM	1~700V	1	*	×
F2-15	Stator resistance of PMSM	0.00~50.00%	0.01	*	×

F2-06～F2-09 these parameters in generally can't find in nameplate of motor. Please perform motor auto tuning to get these parameters. only get F2-07～F2-09 from static auto-tuning.
If the load can easy disconnect from motor, please to performance completely auto tuning to get accuracy motor parameters.
If the load can't disconnect from motor, set F2-10 for 1 to performance auto tuning.

F3-29	Torque boost	0.0~20.0%	0.1	2.0	×

To compensate the low frequency torque characteristics of V/F control, you can boost the output voltage of AC drive at low frequency by modifying F3-29. If the torque boost is set to too large, the motor may overheat, and the AC drive may suffer over current.

If set it for 0, it will performance auto torque boost.

F4-29	Speed display coefficient	0.1~999.9%	0.1	100.0	☆
F4-30	Linear speed display coefficient	0.01~99.99	0.01	1.00	☆
F4-31	Multifunction key MF.K set	0: REV 1: Jog forward 2: Jog Reverse 3: Running command switchover	1	0	×

F4-29 Speed display coefficient that used for correct the speed display.

F4-31 used to define the function of multiple function key on keypad.

F5-15	External terminal command control mode	0: Two lines control mode 1 1: Two lines control mode 2 2: Three lines control mode 1 3: Threes lines control mode 2	1	1	×
F5-16 to F5-21	X1 to X6 terminals function selection（0~40）	1: FWD Forward command 2: REV Reverse command 5: Emergency stop input 11:threes lines control terminal	1		×

The F5-15 parameter used to select terminals control mode, there are 4 control modes in drives.11

FWD stands for running in forward direction control by external terminal, and marks for FWD.

REV stands for running in reverse direction control by external terminal, and marks for REV.
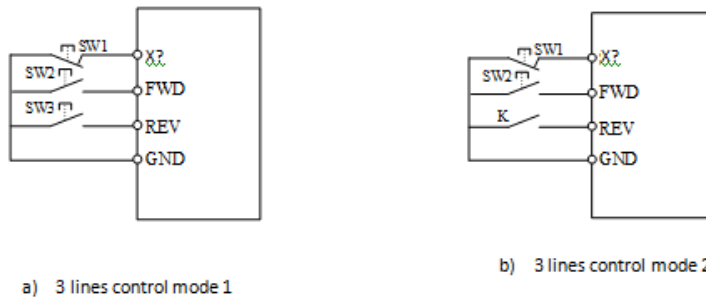
0：Two line control mode 1

Construction	Stop	Running	Forward	Reverse
Terminals status				

1：Two lines control mode 2

Construction	Stop command		Forward	Reverse
Terminals status				

2：Three lines control mode 1

It must be defined one input terminal for 3 lines control mode (one of terminals of F5-16～F5-21 set to 11). Refer to the 3 lines control mode as following wiring.
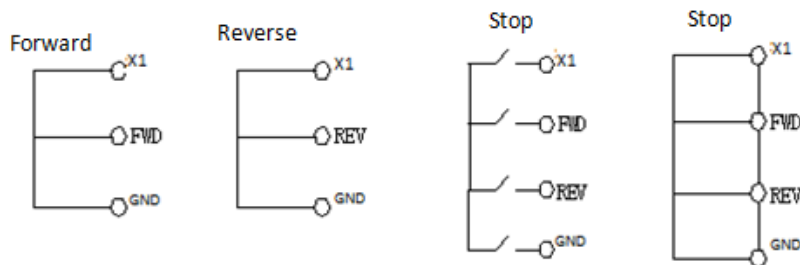
a) 3 lines control mode 1

b) 3 lines control mode 2

3 lines control mode wiring

X? is programmed for 3 line control, we can take one terminals of X1～X6 (F5-16～F5-21) set to 11. SW1 is drive stop trigger switch. SW2 is forward trigger switch, and SW3 is reverse trigger switch.

3: 3 lines control mode 2.

X? is programmed for 3 line control, we can take one terminals of X1～X6 (F5-16～F5-21) set to 11. SW1 is stop trigger switch, SW2 is forward trigger switch, K is reverse selection switch.

If selection X1 for 3 lines control mode, see below wiring diagram.

3 lines control mode description

There are X1 to X6 programmable digital input terminals in this drive, used F5-16 to F5-21 parameters to express it.

Chapter6. Troubleshooting and Countermeasures

The below table lists all types of faults of AD30series drive possibly. Before contacting manufacturer for technical support, you can first determine the fault type through following table description and record your treating process and phenomena. If the fault can not be resolved, please seek for the manufacturer service support.

Troubleshooting table

Fault code	Fault description	Possible reason	Countermeasures	Value
E. SC	Output short circuit	1:Output short circuit or grounding short circuit 2: The load too heavy	1.Check the output connection 2. seek for service support	1
E. OC1	Over current in acceleration	1. Acceleration time is too short 2. too high torque boost or VF curve setting is not correct	1. Extend the acceleration time 2. low the torque boost voltage, and adjust the V/F curve.	2
E. OC2	Over current in deceleration	The deceleration time is too short	Extend the deceleration time	3
E.OC3	Over current in running	The load changed suddenly or fluctuation is too big	Reduce the load fluctuation	4
E.OC4	Soft ware over current	As same as E.OC1，E.OC2，E.OC3 description	As same as E.OC1，E.OC2，E.OC3	5
E.232.	Inner communication fault	Hardware problem	Seek for manufacturer support	6
E.Gnd	Grounding fault	1: Output grounding of motor or drive, 2: Input and output connection of drive	1. Check the connection 2. check the motor if aging or insulation is not good	7
E.OU1	Over voltage in acceleration	1.Input voltage is too high 2. Power supply open and close frequently	Check the Dc input voltage or AC grid condition	8
E. OU2	Over voltage in deceleration	1.Deceleration time is too short 2. Input voltage is abnormal	1.Extend deceleration time 2. Check the input voltage 3. Install braking unit or resistor	9
E.OU3	Over voltage in running	1. Power supply is abnormal 2. load feedback energy	1. Check the voltage of power supply 2. Install braking unit or resistor	10
E. UL	Under voltage	1. Output connection is loss 2. Load suddenly missing	1. Check the output wiring 2. Check the drive load	14
E.OL1	Over load of drive	1. Load is too big 2. Acceleration is too short 3.Torque boost voltage is high, and VF curve is not properly 4.Input voltage is too low	1. reduce the load or change bigger power drive for instead 2. Extend the acceleration time 3. Low the torque boost voltage, and adjust the V/F curve. 4. Check the grid voltage	15
E.OL2	Motor overload	1. The load is too big 2. Acceleration time is too short 3. Protection coefficient setting is is too small	1. reduce the load 2. Extend the acceleration time 3. Low the torque boost voltage, and adjust the V/F	16

		4. Torque boost voltage is high, and VF curve is not properly	curve. 4.set the motor protection coefficient bigger	
E.CUr	Current detect is correct	1. Current detect parts or circuit is problem 2. Auxiliary power supply has problem	Seek for manufacturer support	17
E. LU	Under voltage	1. Power supply voltage is abnormal 2. power supply is fluctuation	1. check the power supply 2. separate power supply	18
E.EF1	External equipment normal open terminal fault	External fault input terminal of the drive signal input	Check the signal source and related equipment	19
E.EF2	External equipment normal close terminal fault	External fault input terminal of the drive signal input	Check the signal source and related equipment	20
E.OH	Drive over heat	1. duct obstruction 2. The ambient temperature is too high 3. Fan damage	1. Clean the duct or improved ventilation 2. Reduce the carrier frequency 3. Replace the fan	21
E.SP1	Input phase loss	1. Input voltage phase loss 2. Input voltage is too low	1. Check the connection 2. Check power supply of phase loss	22
E.SP0	Output phase loss	The connection between drive and motor is broken	Check the wiring	23
E.EEP	Memory fault	Hard ware problem	See for support	24
E.End	Running time is reached	The allowable running time setting is reach	Contact vendor	25
E. PID	PID feedback fault	1. PID feedback single is broken 2. sensor has problem 3. feedback signal parameters setting is not correct	1. Check the feedback channel 2. Check whether the fault sensor 3. Verify the feedback signal meets the set requirements	26
E.485	RS485 communication fault	Send and receive data error occurs in serial communication	1. Check the connection 2. Seek for support	27
E.doG	EMC interference	Since the ambient electromagnetic interference caused by malfunction	Install the absorb circuit	28
E.232	Inner upper communication fault	Hardware problem	Seek for support from vendor	29

Note:
The series drive records the latest three times fault occurs code and output parameters of drive when latest fault occurs. Query information to help find the cause of the fault.